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F01 Voice Activation System

Subject	Page

Voice Activation System

Model: F01/F02

Production: From Start of Production

OBJECTIVES

After completion of this module you will be able to:

- Describe the Voice Activation options available for the F01/F02

- Describe the functions of the Voice Activation System

- Identify the components of the Voice Activation System

Introduction

History

Voice-activated control was offered for the first time as an option for the E38. The system enabled the driver to operate the telephone and the navigation system without taking his or her eyes off the road and the traffic situation.

As the voice recognition system evolved, the number of spoken command the system could recognize increased by leaps and bounds from the initial 30 to the current figure of about 470 (CCC with the "Voice Activation" option in the E60, E90). This means that in the current models, voice control can be used not only for the telephone and the navigation system, but also for entertainment, the address book, the air-conditioning functions and vehicle individualization settings.

Voice Activation is standard equipment on the F01/F02 and it is always combined with the "Navigation System".

Note: The Voice Activation System and the "Navigation System" are both standard on the F01/F02.

The Voice Activation system has been further enhanced.

There is now an even larger range of spoken commands and for the first time the user has the option of individualizing the voice recognition system in accordance with specific needs and preferences. For example, users can match the voice recognition system to their own knowledge base and use the controller to change the spoken-language setting.

Other innovations of the voice activation system include:

- Visual feedback in the instrument panel.
- No audible beep signal during a dialog with the system.
- Combined mode with both voice inputs and controller inputs.
- Intersections and zip codes can be entered as destinations.
- Voice control of contacts, phone book and address book with up to 3000 entries.

System Overview

The following pages show the input/outputs and the schematic circuit diagrams of the F01/ F02 voice input and activation systems.

The driver's side microphone is the only device used for voice input.

Voice input is always activated by pressing the PTT button (push-to-talk button) on the steering wheel.

The control units, sensors, control elements and components involved in the system are shown in the input/output diagrams. A block diagram representation of a specific control unit is additionally shown.

The input/output diagram provides an overview of the system in the form of a signal flow diagram. It does not indicate whether the signals are sent via busses, other control units, hard wiring or by wireless means. This detailed information can be found in the schematic circuit diagram.

The graphic representation is always followed by the corresponding legend which can be found either under the graphic or on the next page.

For the sake of clarity the various individual speakers are not shown in the schematic circuit diagrams.

Inputs/outputs, Voice Activation System
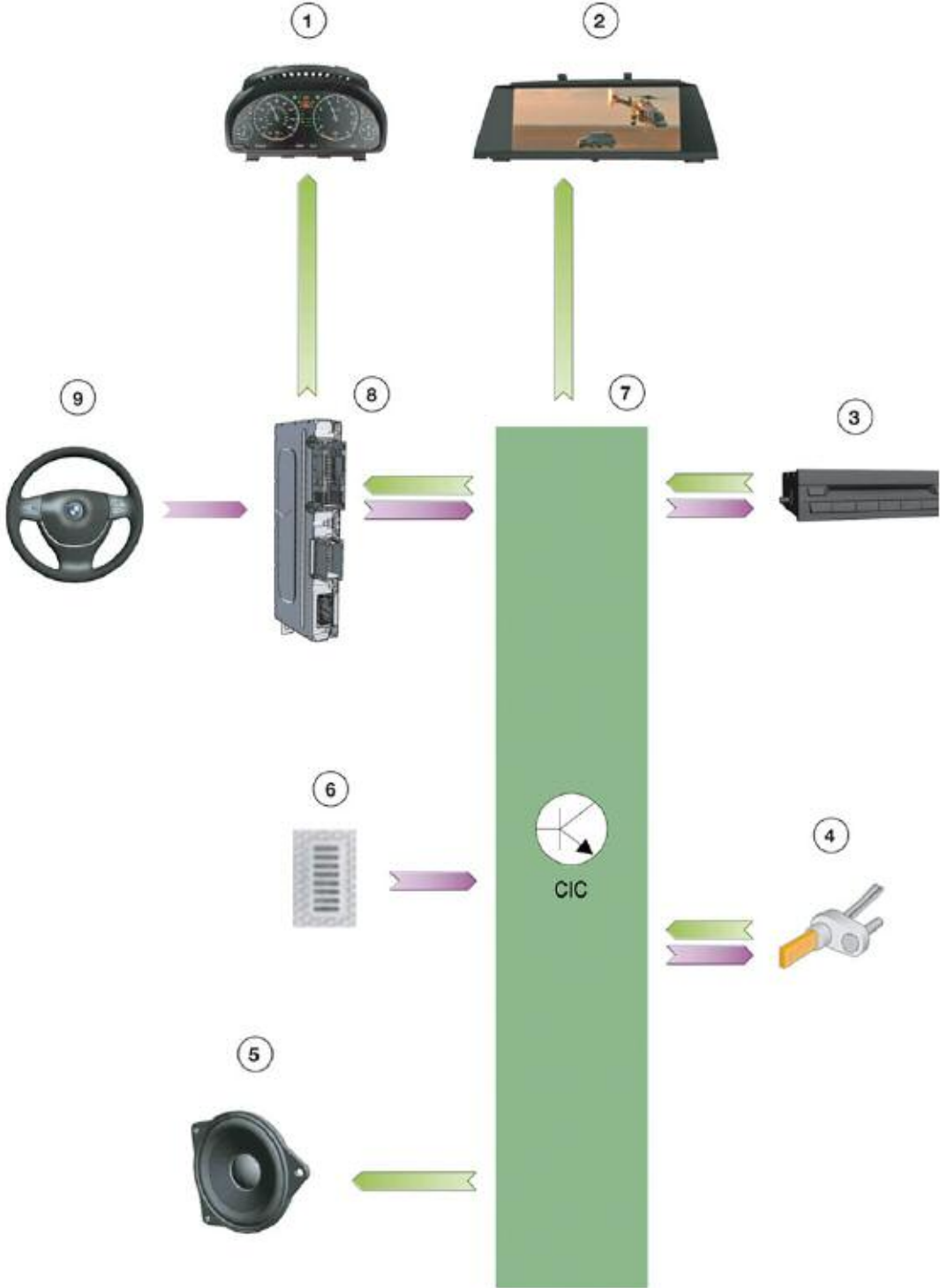
Index	Explanation	Index	Explanation
1	Instrument cluster	6	Microphone (driver's side)
2	Central information display (CID)	7	Car Information Computer (CIC)
3	Other controlled systems such as DVD changer	8	Central gateway module (ZGM)
4	Wheel speed sensor	9	Multifunction steering wheel (MFL)
5	Speaker		

The voice input function is always implemented in the CIC.

The DVD changer serves as an example of the other voice-activated systems that can be controlled.

The wheel speed signals are used for speed- dependent volume control.

Volume can be adjusted by means of the multifunction steering wheel and the IHKA/ audio control unit. Speed-related volume control is also active.

The microphone is connected to the TCU and the telephone commands are processed by the telephone control unit and made available on the MOST bus.

Optional extra	Control unit installed
Voice Activation	TCU CIC
Voice Activation + "USB/audio interface" (option 6FL)	TCU CIC ULF-SBX H
Voice Activation (option 620) + "Smartphone Integration" (option 6NF)	TCU CIC ULF-SBX H

Schematic Circuit Diagram for the Voice Activation System with TCU

F01 Voice Activation System
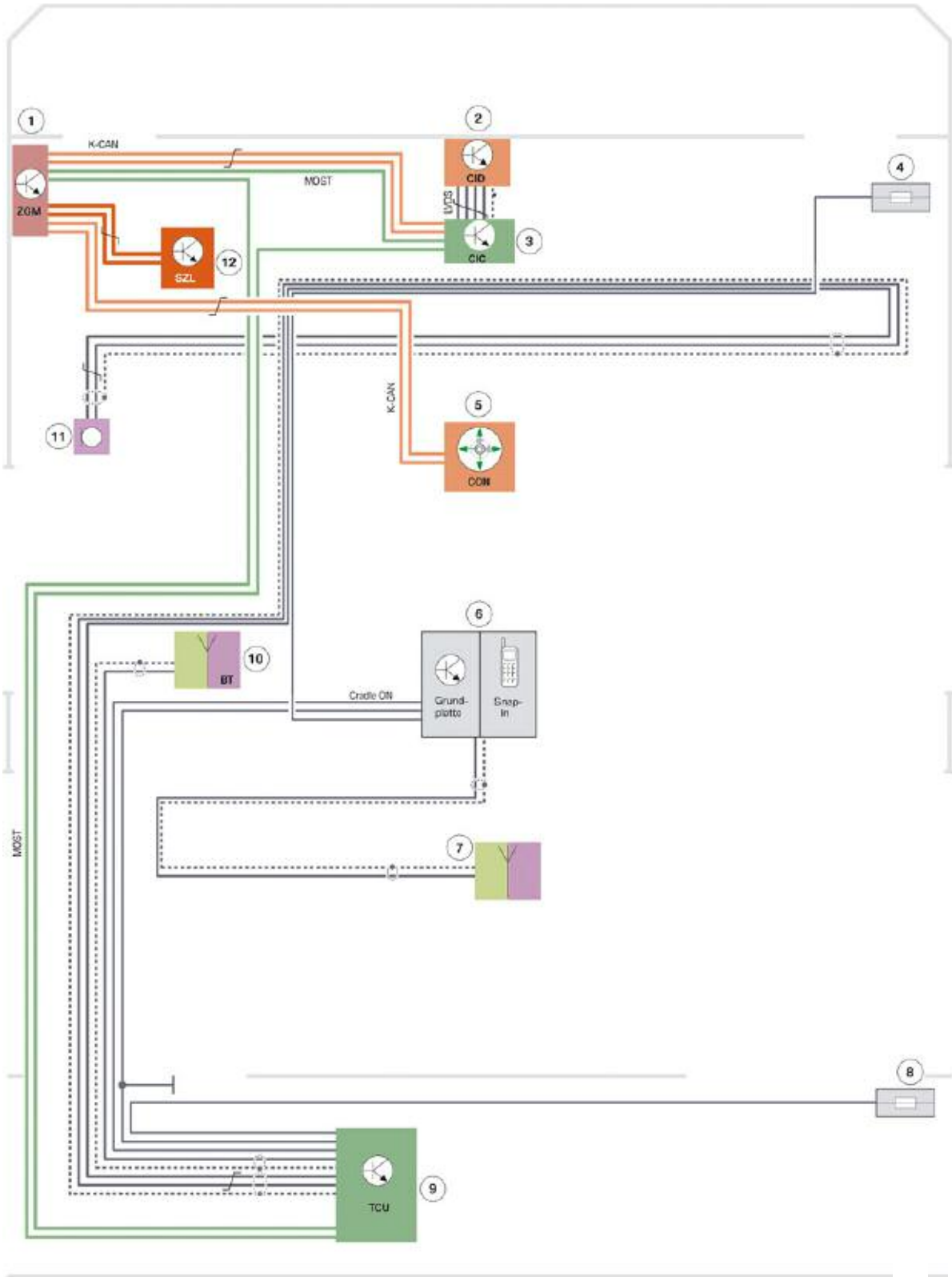
Index	Explanation	Index	Explanation
1	Central gateway module (ZGM)	7	Roof antenna
2	Central information display (CID)	8	Fuse in fuse carrier at rear
3	Car Information Computer (CIC)	9	Telematics control unit (TCU)
4	Fuse in the junction box	10	Bluetooth antenna
5	Controller (CON)	11	Microphone (driver's side)
6	Baseplate with snap-in adapter	12	Steering column switch cluster (SZL)

MOST signals at TCU

In/Out	Signal	Source/sink	Function
Out	Control signals	MOST control units	Controlled systems
Out	Control signals	CIC	Display control of the CIC
Out	Audio signals	CIC	Answer, voice input

System Functions

What can be operated by voice input?

In the F01/F02, broadly speaking all the menus that can be viewed in the CID can be voice-controlled to the second level of a menu.

The graphic below shows the first level of the "Navigation" menu on the left, and the second level on the right.

Direct entry to the first level of the menu is a possibility for reducing the length of operating time needed to activate a particular function. This is done by saying aloud a term from the menu in question. Instead of having to say first "Navigation" and then "Destination entry", the user can simply say "Destination entry" to go directly to this function. The command is executed regardless of which menu is currently open.

"Navigation" menu

Index	Explanation
1	First level of "Navigation" menu
2	Second level of "Navigation" menu

Standard and Short Dialogs

Until now, all voice recognition systems have suffered from the drawback of appearing complicated to inexperienced users (beginners). The difficulties were due to the fact that the user was unaware of how many voice commands were available, or failed to enunciate the commands correctly and completely.

Experienced users (experts) on the other hand, had the advantage of knowing how to use the system quickly by using short commands.

In order to ensure that users in both these groups can use the system to their satisfaction, in the F01/F02 it is possible to select a "Standard" dialog for inexperienced users or a "Short" dialog for experts.

The "Standard" dialog provides detailed information while operation is in progress, but the "Short" dialog dispenses with this information for the sake of rapidity.

Example:

Standard dialog:

SYSTEM: "Say the name of a place"

USER: "Munich"- shows up on the display

SYSTEM: "Did you mean "Munich"?"

USER: "Yes"

Short dialog:

SYSTEM: "Place"

USER: "Munich"- shows up on the display

SYSTEM: "Did you mean "Munich"?"

USER: "Yes"

The dialog setting can be toggled between standard and short by selecting "Settings" "Language/units".

Language/units

Language Setting

The current voice recognition systems do not offer the customer the option of changing the input language without expert assistance. The car has to be brought to the workshop, where BMW Service can change the language setting. The language is changed either by recoding or by replacing the appropriate control unit.

The new 7 Series BMW enables the customer to change not only the display language but also the input and output language of the voice activation system by means of iDrive.

The full range consists of eight languages:

- English (UK)
- French
- German
- English (US)
- Italian
- Spanish
- Dutch
- Japanese

All eight languages are saved on the hard disc.

Depending on the national-market specification, however, only three different languages are selectable with iDrive. The other languages can be activated by coding.

The menu item for changing the language setting is:

   "Setting" - "Language/units".

No beep after each step in a dialog sequence

Until now, before enunciating a command the user always had to wait for a confirmation beep marking the conclusion of a system message. This does not conform to the natural flow of speech, and often results in errors because the user speaks too soon.

In the F01/F02 there is no beep between the individual steps in a dialog sequence. There are now only two audio signals: One signal confirms the start of a dialog sequence and sounds immediately after the user presses the PTT (push-to-talk) button on the steering wheel. A second signal sounds to mark the end of the dialog.

PTT button

Index	Explanation
1	PTT

Visual feedback in the instrument panel

In addition to the acoustic feedback issued by the voice input and activation system, the user also receives visual confirmation of the result (e.g. after enunciating the command "New number" via the instrument panel. The system's input prompt "e.g. Enter digits" appears at the same time in the instrument panel.

Consequently, the user has improved orientation and can more easily follow the sequence of functions and the changes from menu to menu in the CID.

Display on the instrument panel

Index	Explanation
1	Readout showing result of interaction with the voice input and activation system
2	Input prompt issued by the voice input and activation system

Combined mode with voice and iDrive inputs

This new function enables the user to operate the system by a combination of spoken commands and iDrive actions.

Until now, voice input has always aborted as soon as the controller was used to select an entry. This meant that the user had to press the PTT button again in order to resume voice input to complete the sequence.

In the F01/F02 the voice-input dialog remains open even if the controller is moved, so the user can immediately resume voice input to continue interacting with the system. This makes it much easier, for example, to enter a destination for the navigation system by selecting a street name from a list.

Extended destination entry in navigation

Voice-assisted destination entry has been extended in the following ways:

- Entry of intersections spoken command

- Entry of Zip codes

Voice control with up to 3000 entries

Until now, the phone book was the only administration function for which voice input could be used. In the F01/F02 it is now possible to use spoken commands to administrate the contacts, phone book and the address list. This means that three lists with up to 3000 entries can be operated by voice control.

System Components

The voice input and activation system is implemented in the following control units:

- Telematics Control Unit (TCU)

- Voice input and activation system
  – CIC

The voice-input commands are transmitted via MOST or the central gateway module (ZGM) to the receiving control unit.

Voice output consists of recorded audio signals stored in the control unit for the voice input and activation system. The audio signals are then made available on the MOST bus in the form of digital signals.

TCU

The TCU used on the F01/F02 is an evolved unit based on the TCU from the E70.

Telematics Control Unit
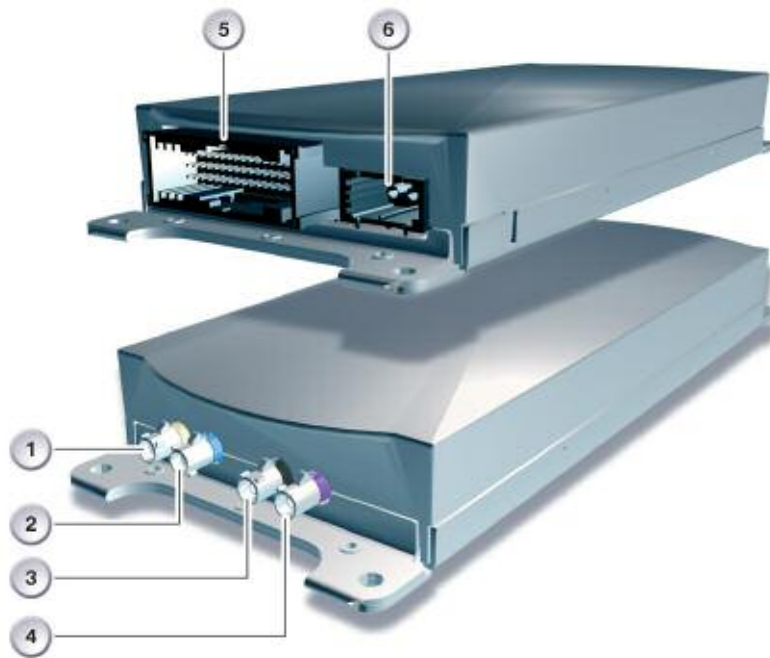
Index	Explanation	Index	Explanation
1	Bluetooth antenna connection, transparent connector	4	Emergency antenna connection purple connector
2	GPS antenna connection blue connector	5	54-pin connector
3	Roof antenna connection black connector	6	MOST connection

TCU Location

ULF-SBX "High" and the TCU are located on the left side of luggage compartment
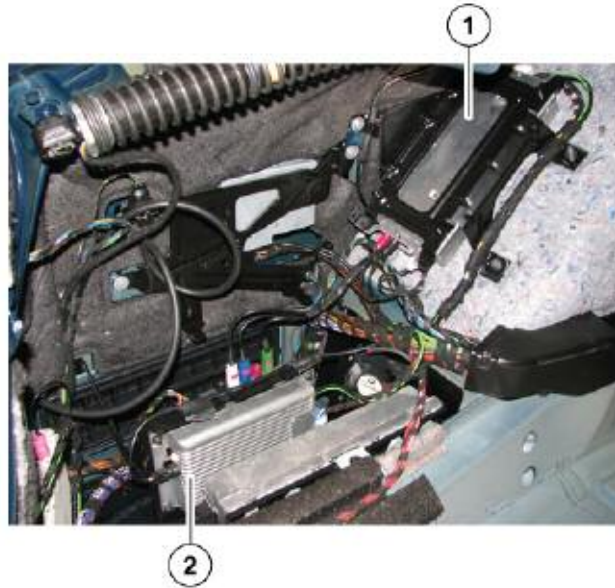
Location of the TCU and ULF–SBX-H

Index	Explanation
1	TCU
2	ULF-SBX High

Voice Activation System

IHKA/audio control panel

Index	Explanation	Index	Explanation
1	Turn/push button for volume control of the audio system (ON/OFF)	3	Slot in DVD player
2	Favorite buttons	4	Eject button for the DVD player

The Voice Activation system supports all the menus viewable on the CID. Voice control also extends to the second level of the menu tree.

The CIC has eight languages, all saved on the internal hard disc. Three of these languages are user-selectable by iDrive. The other languages can be activated by coding.

The volume of voice output can be adjusted by means of the multifunction steering wheel and the IHKA/audio control unit.

The CIC is mounted behind the IHKA/audio control panel in the instrument panel.

Hard Disc

For the first time, a hard disc for storing applications (programs) and data is used in a head unit. It is a 2.5" hard disc with a capacity of 80GB.

0.5 GB of storage space is reserved on the hard disc for the data of the voice recognition system (iSpeech).

CIC hard disc

Index	Explanation
1	CIC
2	Hard disc (slide-in tray)